

Patent Claims

1. Initiator System for initiation of a radical polymerization of a preparation with monomers and/or oligomers which include ethylenic unsaturated groups, thereby characterized, that it contains the open-chain and/or cyclic N,N-diacylhydroxylamine of the general formula $R-CO-N(OH)-CO-R'$, wherein R and R' are selected from the group of aliphatic, linear, branched and/or cyclic and/or aromatic hydrocarbons and R and R' may be linked with each other forming a ring, and includes co-initiators which contain metal ions with multiple oxidation levels in the range of from 1 to 8 or tertiary amines.
2. Initiator System for initiation of a radical polymerization of a preparation with monomers and/or oligomers which include ethylenic unsaturated groups, thereby characterized, that it includes open-chain and/or cyclic O-alkylated or O-acylated N,N-diacylhydroxylamine of the general formula $R-CO-N(OH)-CO-R'$, and co-initiators with metal ions, which can exhibit at least two oxidation levels in the range of from 1 to 8, wherein X represents -H, -R'' or -CO-R''' and R, R', R'' and R''' are the same or different organic substituents, selected from the group of aliphatic, linear, branched and/or cyclic, substituted and/or unsubstituted hydrocarbon and/or aromatic hydrocarbons and R and R' can be joined to each other to form a ring.

3. Initiator system according to Claim 1 or 2, thereby characterized, that R, R', R'' and/or R''' are hydrocarbon chains with a chain length of 2 to 18 atoms.
4. Initiator system according to Claim 3, thereby characterized, that the group X is comprised of an alkyl residue with 1 to 6 C atoms or an aliphatic, aromatic or heteroaromatic acyl residue with at least 2 C-atoms.
5. Initiator system according to one of Claims 2 through 4, thereby characterized, that the metal ions are selected from the group of the transition metals and are oxidizable by atmospheric oxygen and reducible by N,N-diacylhydroxylamine.
6. Initiator system according to one of Claims 1 through 5, thereby characterized, that the co-initiator contains metal ions from the group Ti, V, Cr, Mo, W, Mn, Fe, Co, Rh, Ir, Ni, Pd, Pt and/or Cu.
7. Initiator system according to Claim 6, thereby characterized, that the co-initiator contains metal ions from the group alkali, earth alkali as well as Bi, Pb and/or Ce.
8. Initiator system according to one of the preceding Claims, thereby characterized, that the residues R and R' are linked to form a chain, of which the length lies at from 2 to 14 atoms.
9. Initiator system according to one of the preceding Claims, thereby characterized, that the residues R and R' contain

at least one hetero atom from the group N, O and/or S and are joined to each other, so that a cyclic N,N-diacylhydroxylamine or N,N-diacylhydroxylamine derivative with a ring size of 5 to 12 atoms is formed.

10. Initiator system according to one of Claims 1 or 2, thereby characterized, that the residues R and R' form a closed ring system with 5 to 14 ring atoms, to which the N,N-diacylhydroxylamine group, or the derivative thereof, is joined via their acyl groups.
11. Initiator system according to Claims 1 or 2, thereby characterized, that the cyclic N,N-diacylhydroxylamine or the derivatives thereof are formed by N-hydroxyl-phthalimide, N-hydroxylmaleinimide or hydroxamic acid and/or N-hydroxyl-succinimide.
12. Initiator system according to one of Claims 1 or 2, thereby characterized, that the initiator system includes air or O₂.
13. Initiator system according to one of Claims 1 or 2, thereby characterized, that the radical initiator system includes additional radical initiators on the basis of peroxides, azo compounds or C-C-bond splitting initiators.
14. Use of initiator systems according to one of the preceding Claims for initiation of cross linking of polymerizable preparations, which contain (meth) acrylate and/or (meth) acrylate - containing monomers and/or oligomers.

15. Use of initiator systems according to one of Claims 1 through 13 for cross-linking or curing of paints or lacquers, coating solutions, coating materials, mold materials, adhesives, resins, mold materials, dental materials or filler materials, which contain polymerizable (meth) acrylate groups.
16. Process for initiation of a radical polymerization of polymerizable compounds with ethylenic unsaturated groups under the influence of oxygen, thereby characterized, that the polymerization is substantially by the thermal initiated formation of oxyl-radicals of open-chain and/or cyclic N,N-diacylhydroxylamines or their O-alkyl, or O-acyl derivatives with the general formula $R-CO-N(OH)-CO-R'$, $R-CO-N(O-R'')-CO-R'$ or $R-CO-N(O-CO-R''')-CO-R'$, wherein R, R', R'' and R''' mean the same or different organic substituents selected from the group aliphatic, aromatic, linear, branched and/or cyclic, substituted and/or unsubstituted hydrocarbon, and R and R' may be joined to each other to form a ring.
17. Process according to Claim 16, thereby characterized, that the formation of the oxyl radical is coupled with the reduction of metal ions of a co-initiator from a higher into a lower oxidation level.
18. Process according to Claim 17, thereby characterized, that as co-initiator metal salts are employed, of which the metal ions can be transitioned by N,N-diacylhydroxylamine from a higher to a lower oxidation level.

19. Process according to Claim 16, thereby characterized, that the residues are organic residues, wherein R, R', R'' and/or R''' are aliphatic or, with the exception of R'', aromatic, and can contain hetero atoms.
20. Process according to Claim 16, thereby characterized, that the temperature for initiation is below 150°C.
21. Process according to Claim 16, thereby characterized, that the oxygen content in the gas environment of the polymerizable compound lies in the range of 25 to 0.01 Vol.%.
22. Process according to Claim 16, thereby characterized, that the preparation contains a UV-initiator and prior, during or subsequent to the initiation of the thermal initiated polymerization is partially irradiated with energy rich light or UV-light.